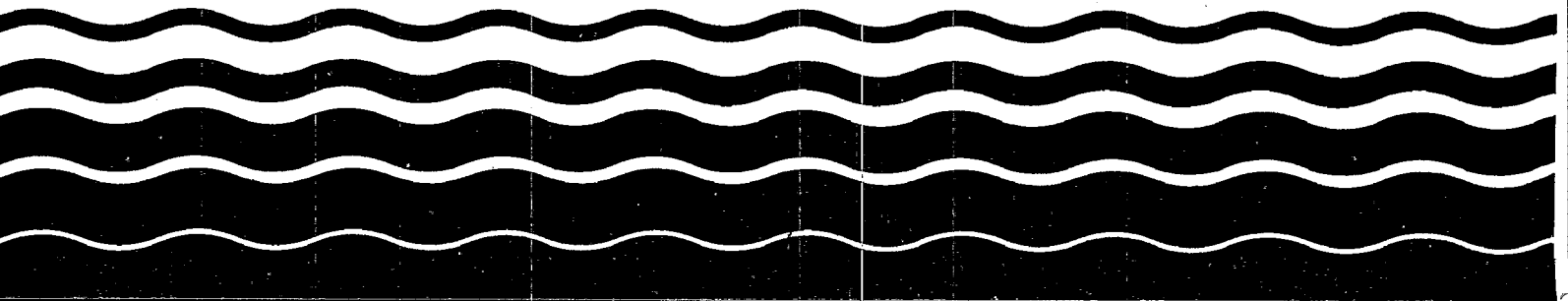




Clean Water Act Section 403 Report to Congress: Phase II — Point Source Discharges Inside the Baseline





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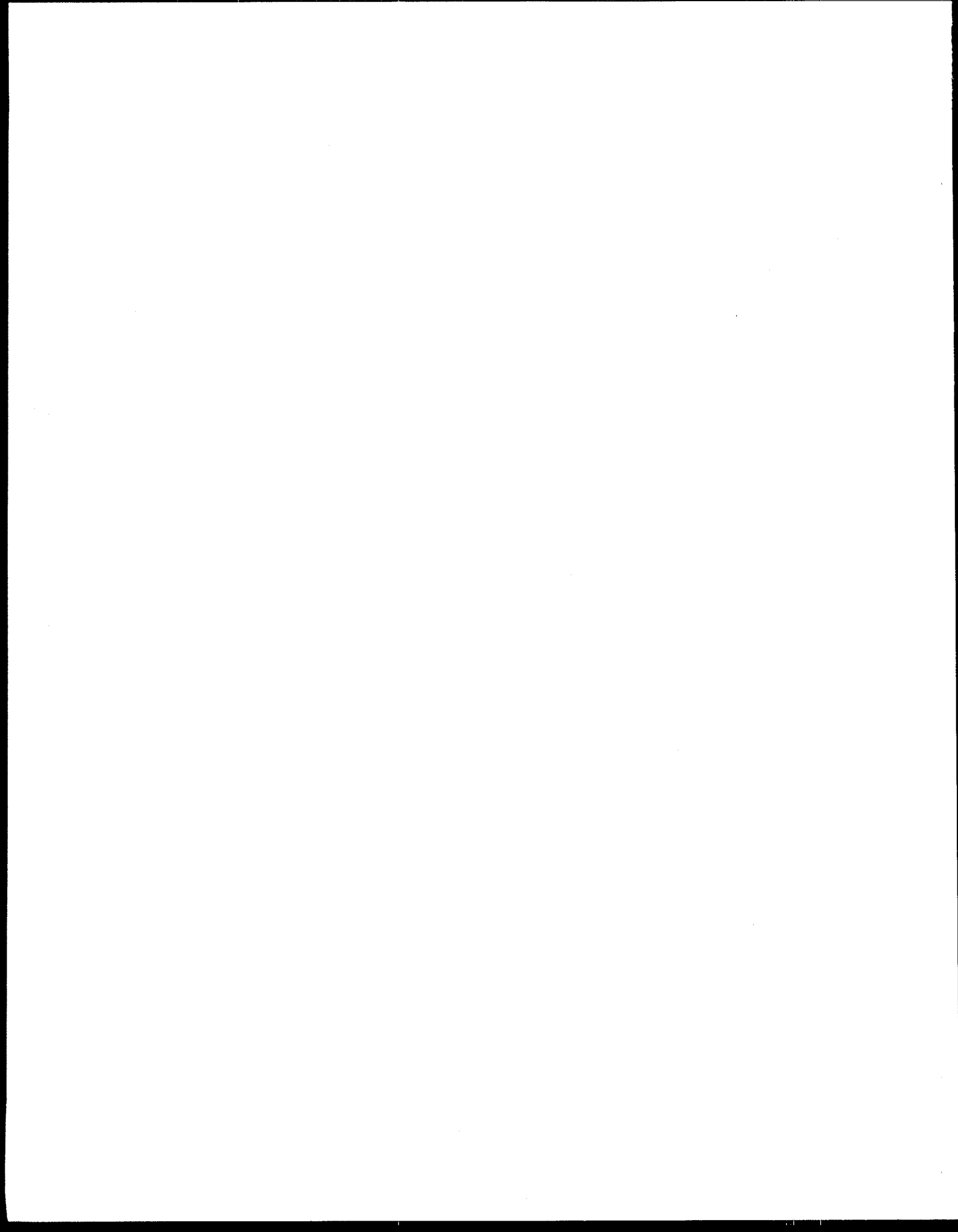
Report to Congress:

Phase II — Point Source Discharges

Inside the Baseline

April 1994

**United States Environmental Protection Agency
Office of Wetlands, Oceans and Watersheds
Oceans and Coastal Protection Division
Washington, DC**



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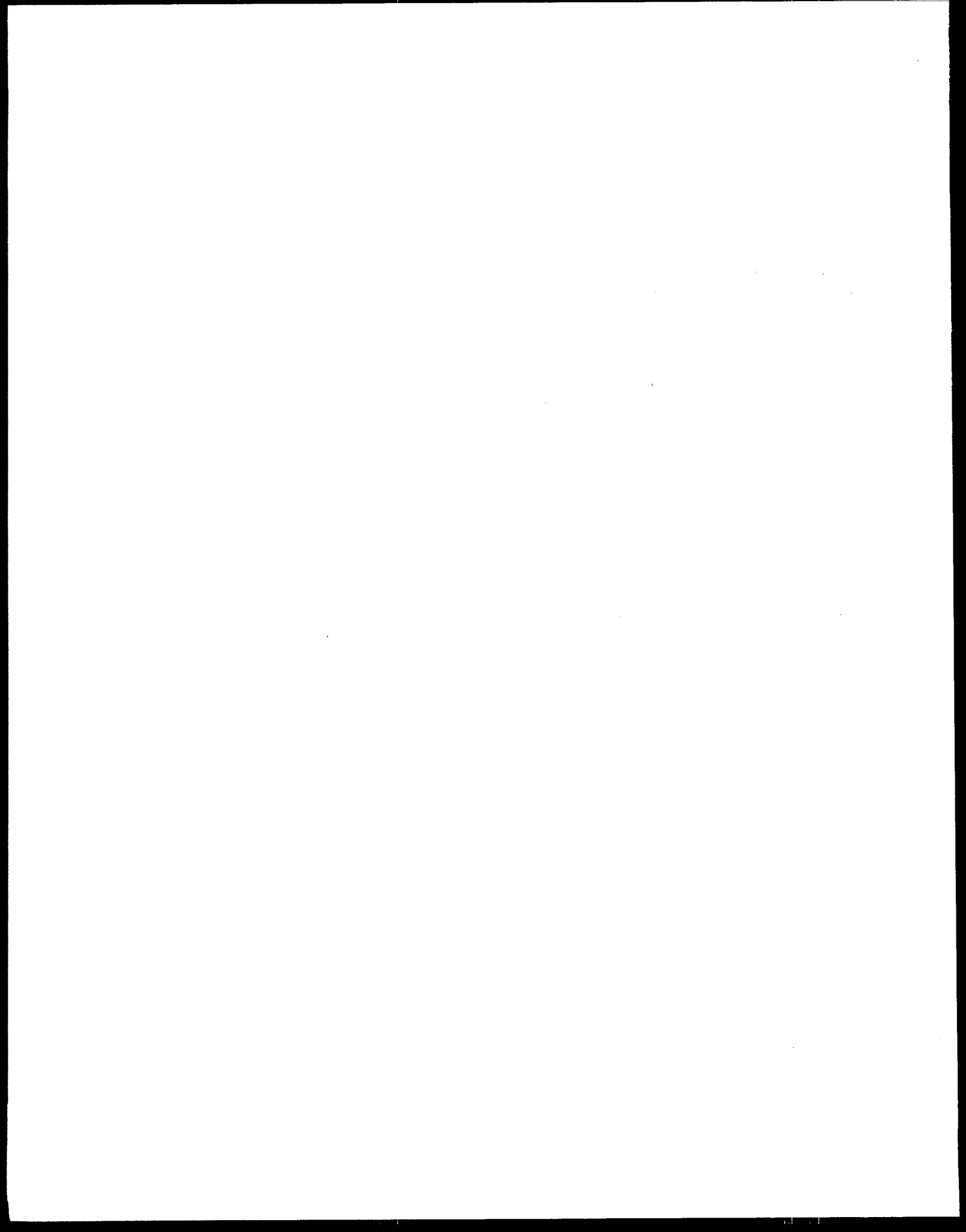
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EXECUTIVE SUMMARY

Purpose

In response to a request from the U.S. House of Representatives, Committee on Merchant Marine and Fisheries, the U.S. Environmental Protection Agency (EPA) has conducted an inventory and assessment of effluent discharges to estuarine waters. The purpose of this effort is to provide Congress with the information necessary to properly consider the consequences of legislation that would extend the requirements of section 403 of the Clean Water Act (CWA) to include effluent discharges to estuarine waters. This report responds to Congress's request for information and presents the findings of EPA's assessment.

Background

Section 403 currently requires that discharges to the territorial seas, contiguous zone, and oceans comply with regulatory requirements above and beyond those specifically required of a typical National Pollutant Discharge Elimination System (NPDES) permit. Such requirements are intended to ensure that no unreasonable degradation of the marine environment will occur as a result of a discharge; these requirements can include ambient monitoring programs designed to determine degradation of marine waters, alternative assessments designed to evaluate the consequences of various disposal options, and process modifications designed to reduce the quantities of pollutants requiring disposal and thus the potential for environmental harm. In evaluating the potential effects of a marine¹ discharge during permit application review, the permitting authority must consider 10 factors or guidelines that emphasize an assessment of the impact of a marine discharge both on the biological community in the area of the discharge and on surrounding biological communities. Under the provisions of section 403, the permitting authority can require the permit applicant to provide the information necessary to conduct such an assessment. An NPDES permit cannot be issued for these discharges unless the requirements of section 403 are met.

Discharges to the surface waters of the United States are permitted under either individual or general NPDES permits. An individual permit normally involves one or more stationary outfalls (pipes) discharging from a single facility. A general NPDES permit (under 40 *CFR* 122.28) may be written to regulate multiple point sources that have the same or similar types of operations, discharge the same or similar types of wastes, and require the same or similar effluent limitations and monitoring conditions. For example, EPA issues general NPDES permits that cover discharges from offshore oil and gas activities and discharges from seafood processing.

¹ For ease of reference, this report will use one term, "marine discharge."

There are currently 303 land-based marine discharges under individual permits known to be subject to the provisions of section 403. Although the number varies each year, approximately 2,549 oil and gas exploration and production facilities are currently permitted to discharge to marine waters under 5 general permits (USEPA, 1993). Also, approximately 300 seafood processing facilities discharge to Alaskan marine waters under a single general permit. However, not all oil and gas and seafood discharges are covered under general NPDES permits; some are covered under individual permits. Both general and individual permit discharges are also subject to section 403 requirements.

Extension of Section 403 Inside the Baseline

EPA estimates that almost 20,000 industrial and municipal facilities (including more than 2,600 "major" facilities) discharge into estuarine waters of the United States. This is nearly one-third of the total number of point source discharges currently regulated under the NPDES program. For the purposes of this report, this number includes all discharges that occur directly to estuarine waters or to waters in estuarine drainage areas and is based on an evaluation of the National Oceanic and Atmospheric Administration's (NOAA) National Coastal Pollutant Discharge Inventory (NCPDI) and EPA's Permit Compliance System (PCS) permit inventory. All or some portion of these discharges could be subject to section 403 should the program be extended to include estuarine discharges.

In addition to section 403, several other pollution control programs with application to coastal waters are required under the CWA, including the water quality standards (section 303(c)) program and the NPDES permit (section 402(a)) program, both of which apply to the territorial seas as well as waters inside the baseline. The water quality-based permitting program under NPDES regulates discharges to coastal waters by requiring them to comply with all State water quality standards. EPA believes that the issuance of NPDES permits to ensure compliance with water quality standards fulfills many of the objectives of section 403; however, in certain circumstances the section 403 process can serve as a regulatory tool that complements and goes beyond existing approaches to water pollution control in the estuarine environment. The potential benefits of implementing section 403 for discharges to estuarine waters include (1) *protection of sensitive habitats* (e.g., coral reefs, shellfish beds): the additional environmental assessments required for discharges of greatest concern to sensitive and ecologically important estuarine environments (i.e., Ocean Discharge Criteria Evaluations and ambient monitoring requirements); (2) *alternative assessments*: the requirement to demonstrate that there is no reasonable alternative to the on-site disposal of waste materials; (3) *pollution prevention*: the requirement to evaluate potential pollution prevention options prior to being allowed to discharge; and (4) *burden of proof*: the requirement that the permit applicant submit sufficient information to support a determination to issue an NPDES permit (i.e., demonstrate that no unreasonable degradation of the environment will occur as a result of the discharge).

The potential problems associated with applying section 403 to waters inside the baseline are, however, also significant. These problems are related to the large number of discharges potentially affected and other factors, including the following:

- The limited scientific understanding of, and ability to establish a direct relationship between, the sources, fate, and effects on biological communities and biological systems of pollutants discharged to estuarine and marine waters.
- The additional time that would be required to evaluate the considerable amount of environmental data that could be required under section 403, potentially resulting in significant increases in backlogs and delays in permit reissuance.
- The resources that would be required by EPA and the States to implement the program, potentially resulting in fewer available resources for other EPA and State programs with important implications for marine and estuarine waters.

Findings

Based on EPA's evaluation of estuarine discharges and pollutants of concern for estuarine waters and its assessment of the implications of requiring implementation of section 403 for such discharges, the Agency has developed the following findings:

- *Implementing section 403 for all estuarine discharges on a broad-scale basis is not necessary or advisable.* In the majority of cases, the water quality-based approach to permitting is sufficient to protect estuarine environments from unreasonable degradation due to effluent discharges. The limits of scientific information to address the Ocean Discharge Criteria restrict EPA's ability to fully implement section 403 inside the baseline. The costs to industry and municipalities associated with requiring all estuarine dischargers to conduct section 403-type assessments and the costs to EPA and NPDES -authorized States to review the information generated by these assessments could be disproportionately large compared to the environmental benefits that would be derived.
- *If Congress mandates the application of section 403 to estuarine discharges, EPA should be given authority to implement the program on a discretionary basis.* In certain circumstances, the requirements of section 403 could be used to focus environmental impact assessments on estuarine or other sensitive habitats that may not be fully protected by the water quality standards regulations of section 402. The section 403 requirements could make it easier to require certain types of information (e.g., monitoring data) from dischargers and to require an alternative discharge evaluation as stated in EPA's current regulations (40 *CFR*, Part 125, Subpart M).

Such circumstances would include (1) when less environmentally damaging alternatives to direct effluent discharge may be available; (2) when impacts may occur due to pollutants for which no water quality standards exist; and (3) any other circumstance where the permit writer does not believe sufficient information is available to make an informed decision concerning a discharge's potential impact on ecologically sensitive habitats or resources (e.g., coral reefs, shellfish beds).

- *As an alternative approach to extending section 403 authority, section 402 could be amended to specifically require assessments similar to those required under section 403 for select estuarine discharges of concern.* Either approach would achieve the same end result, the requirement for additional environmental assessments for those discharges of greatest concern in estuarine waters.

1. INTRODUCTION

Congress passed the Federal Water Pollution Control Act (FWPCA) of 1972 out of concern that existing Federal and State efforts in water pollution control were not effective. The framework of the FWPCA, now amended and commonly known as the Clean Water Act (CWA), is generally based on a two-pronged approach. First, the Environmental Protection Agency (EPA) is to develop national minimum technology-based treatment requirements based on an assessment of the achievability of control technologies by individual categories of dischargers. Second, States are to set water quality standards to be used in addition to technology-based controls to achieve water quality objectives for a particular body of water. In the case of marine discharges, section 403 of the CWA further requires that such discharges comply with additional conditions that emphasize an assessment of the impact of a marine discharge both on the biological community in the area of the discharge and on surrounding biological communities. All discharges that occur in waters beyond the baseline from which the territorial seas are measured (i.e., the territorial seas, contiguous zone, and oceans) are currently subject to the provisions of section 403.

In section 1007 of the Ocean Dumping Ban Act of 1988, Congress requested a report from EPA on the current status of the implementation of section 403. The *Report to Congress on Implementation of Section 403(c) of the Clean Water Act*, also known as the "Section 403 Report to Congress: Phase I," was submitted to Congress in June 1990 (USEPA, 1990b). The focus of the Phase I report was the reported 323 land-based marine discharges under individual permits known to be subject to section 403 in 1990. Information was also presented on facilities under general permits that discharge to marine waters (10 offshore oil and gas general permits and a single general permit for seafood processors).

Based on the information presented in the Phase I report, members of the U.S. House of Representatives, Committee on Merchant Marine and Fisheries, sent a letter to the Administrator of EPA requesting information on discharges to estuarine waters. The letter requested that EPA provide Congress with the information necessary to properly consider the consequences of legislation that would extend the requirements of section 403 to include effluent discharges in estuarine waters. Specifically, Congress requested the identification of estuarine discharges by State and, if possible, by waterbody; the identification of major and minor discharges; and an evaluation of industry or pollutant categories and the potential environmental effects of such "categorized discharges" in estuarine waters. The purpose of this report, known as the "Section 403 Report to Congress: Phase II," is to address these issues and to evaluate the implications of extending section 403 requirements into estuarine waters. There is some degree of overlap in the material presented in the Phase I and Phase II reports. However, the focus of the Phase I report is on direct marine discharges, whereas the focus of the Phase II report is on estuarine discharges.

The remainder of this chapter provides a brief summary of the jurisdiction of section 403 and a review of the Phase I report. Chapter 2 of this document describes existing programs for controlling point source effluent discharges. The implications of extending section 403 to include estuarine waters are discussed in Chapter 3. The findings of this assessment are presented in Chapter 4.

Review of Section 403 Requirements

Section 403 of the CWA is that part of the National Pollutant Discharge Elimination System (NPDES) permitting process that currently applies only to effluent discharges seaward of the baseline. In addition to the requirements specifically defined in section 403, all marine discharges must also meet the requirements of CWA section 402, including both technology-based and, for discharges to the territorial seas, water quality-based pollution controls.

Section 403 provides that no NPDES permit for discharges to the territorial sea, the waters of the contiguous zone, or oceans may be issued unless it is in compliance with the marine discharge guidelines. Section 403 required EPA to promulgate such guidelines to be used for determining the degradation of the marine environment. These guidelines include an evaluation of the following:

- The effect of disposal of pollutants on human health or welfare, including but not limited to plankton, fish, shellfish, wildlife, shorelines, and beaches.
- The effect of disposal of pollutants on marine life, including the transfer, concentration, and dispersal of pollutants or their by-products through biological, physical, and chemical processes; changes in marine ecosystem diversity, productivity, and stability; and species and community population changes.
- The effect of disposal of pollutants on aesthetic, recreation, and economic values.
- The persistence and permanence of the effects of disposal of pollutants.
- The effect of disposal, at varying rates, of particular volumes and concentrations of pollutants.
- Other possible locations and methods of disposal or recycling of pollutants including land-based alternatives.²

²It should be noted that consideration of available alternatives is part of the permitting process for New Sources (i.e., offshore oil and gas) under the National Environmental Policy Act.

- The effect on alternative uses of the oceans, such as mineral exploitation and scientific study.

EPA's Ocean Discharge Criteria regulations (40 *CFR* Part 125, Subpart M [45 *FR* 65942, October 3, 1980]) establish the guidelines required by section 403. The regulations prohibit issuance of a permit if unreasonable degradation of the marine environment would result and specify 10 factors to be considered when making this determination (Table 1). These factors or guidelines are primarily aimed at assessing the ecological effects of discharges. Based on

Table 1. Ocean Discharge Guidelines

- (1) Quantities, composition, and potential bioaccumulation or persistence of the pollutants to be discharged.
- (2) Potential transport of the pollutants by biological, physical, or chemical processes.
- (3) Composition and vulnerability of potentially exposed biological communities, including
 - unique species or communities,
 - endangered or threatened species,
 - species critical to the structure or function of the ecosystem.
- (4) Importance of the receiving water area to the surrounding biological community, e.g.,
 - spawning sites,
 - nursery/forage areas,
 - migratory pathways,
 - areas necessary for critical life stages/functions of an organism.
- (5) The existence of special aquatic sites, including (but not limited to)
 - marine sanctuaries/refuges,
 - parks,
 - monuments,
 - national seashores,
 - wilderness areas, and
 - coral reefs/seagrass beds.
- (6) Potential direct or indirect impacts on human health.
- (7) Existing or potential recreational and commercial fishing.
- (8) Any applicable requirements of an approved Coastal Zone Management Plan (CZMP).
- (9) Such other factors relating to the effects of the discharge as may be appropriate.
- (10) Marine water quality criteria.

the results of such an assessment, section 403 provides an opportunity to develop permit limits and conditions to ensure that unreasonable degradation does not result. Much, if not all, of the information necessary to make these evaluations already will be available to the permitting authority. If such information is not available to the permitting authority, additional information may be requested from the applicant. In those cases where insufficient information exists to support a finding of no unreasonable degradation, applicants must demonstrate that the discharge will not cause irreparable harm, perform any necessary monitoring, and conduct an alternative assessment as part of permit conditions. The permit may also include any additional safeguards as specified in the regulations, including the requirement for process modifications such as the substitution of less hazardous chemicals for those which are potentially harmful. A more complete discussion of the Ocean Discharge Criteria regulations and their implementation is presented in the Phase I report.

Findings and Conclusions of the Section 403 Report to Congress: Phase I

In 1990, the Phase I report identified 323 "definite" discharges and 217 "potential" discharges subject to section 403 compliance under individual NPDES permits (not including general permits).³ Of the 323 discharges with individual permits known to be subject to section 403 in 1990, 53 percent were sewage treatment facilities, 10 percent were industrial plants discharging conventional pollutants (BOD, total suspended solids, pH, etc.), 27 percent were industrial plants discharging toxic and nonconventional pollutants, and 10 percent were electric facilities. The areas with the greatest number of direct marine discharges under individual permits subject to section 403 were Puerto Rico and the Virgin Islands (74), Hawaii and the Pacific Islands (67), and California (45).

General NPDES permits are also issued under section 403 in those cases where a number of like discharges with similar effluent are operating under similar discharge conditions. As explained in the Phase I report, all general permits subject to section 403 requirements, except one that was issued for seafood processing, were written for offshore oil and gas activities. At the time of the Phase I report, there were nine offshore oil and gas exploration and production general permits covering activities located in the Gulf of Mexico and offshore Alaska and California.⁴

EPA has found that although most discharges outside the baseline are in compliance with section 403, the detail and extent of the review, the effectiveness of the monitoring programs,

³EPA estimates that in 1992 there were 303 ocean discharges under individual permits subject to the provisions of section 403.

⁴Currently there are only five general permits for offshore oil and gas activities: two in the Gulf of Mexico, one in California waters, and two in Alaskan waters.

and the level of review performed after the permits are issued have varied by Region, State, and discharge. The Agency also identified potential barriers to the effective implementation of section 403 outside the baseline, including limitations on available resources and technical support and limitations of the scientific knowledge to adequately address the complex issues of biological impacts and toxicity assessments in the marine environment.

The limited resources available for performing section 403 reviews at the State level and for monitoring and providing guidance for State activities have been identified as a major impediment to full implementation of the current section 403 authority. EPA estimates that implementation of section 403 for all known "major"⁵ individual direct marine discharge permits (for approximately 180 major discharges) currently costs a total of approximately \$1.1 million annually, including EPA Headquarters, Regional, and contracting support. This level of effort includes only the resources required to address those NPDES permitting elements that result directly from section 403 requirements. These elements are primarily related to program development, section 403 evaluations, and monitoring/modeling activities. EPA also estimates that the States authorized to carry out the NPDES permit program require approximately \$250,000 annually for conducting section 403 reviews for individual permits of major direct marine discharges.

The effective implementation of section 403 has also been limited by a lack of established specific technical guidance for determining "unreasonable degradation," "no irreparable harm," and "no reasonable alternatives to on-site disposal." To address these and other section 403-related technical issues, EPA is developing a strategy to ensure more consistent implementation of section 403 requirements in marine environments. As part of this strategy, the Agency is working to develop national technical and procedural guidance, incorporate new technological advances and criteria, and integrate section 403 procedures into the water quality-based approach for toxics control in marine waters.

The Phase I report suggested that no additional legislative authority (beyond the mandates of section 403) is necessary to protect the marine environment from the impacts of direct marine discharges since the section 403 authority is adequate for accomplishing that purpose. However, the Agency is considering amending existing regulations to ensure more consistent implementation of the section 403 marine discharge program.

The Phase I report concludes that the success of incorporating the section 403 guidelines into the permitting processes depends on (1) the extent to which science can be developed to

⁵EPA classifies industrial discharges as "major" or "minor" based on an evaluation of the potential for toxic pollutant discharge, traditional pollutants in the effluent, potential human health impacts, flow rate of effluent, and various water quality factors. Municipal discharges are classified as "major" if ownership is public, the facility is active, the flow rate is 1 million or more gallons per day or a population of 10,000 is served, or the discharge causes significant water quality impacts.

Introduction

establish a cause-and-effect relationship between discharges and adverse effects on the marine environment; (2) the extent to which there is information to address the marine discharge criteria; (3) the resources that the Agency and NPDES-authorized States are able to commit to the reviews, permit writing, and analysis of data generated from monitoring requirements in the permits; (4) the development of methods for establishing sediment and biological criteria for marine receiving waters; and (5) national technical guidance for conducting section 403 evaluations.

2. PROGRAMS FOR CONTROLLING POINT SOURCE EFFLUENT DISCHARGES

NPDES Permitting Program

Section 403 is one of many authorities under the comprehensive CWA to regulate discharges of pollutants to the surface waters of the United States. In considering whether to apply section 403 to dischargers inside the baseline, it is important to keep this in mind. Because application of section 403 takes place within the overall framework of CWA point source control requirements, a brief summary of those requirements is set out below.

Section 402 of the CWA and its implementing regulations established the National Pollutant Discharge Elimination System (NPDES), under which permits are issued to point source dischargers to waters of the United States. The NPDES regulations make it clear that all discharges to waters of the United States must comply with State water quality standards. The regulations, furthermore, require that all discharges be evaluated for their potential to impair water quality and that water quality limits are mandatory wherever States and/or EPA project water quality impairment.

NPDES permits are intended to set out the conditions under which facilities must operate in order to meet all technology-based requirements and attain State water quality standards. NPDES permits must specify national minimum treatment requirements based on an assessment of the achievability of control technologies by individual categories of dischargers (the technology-based approach). The permits must also contain limitations more stringent than technology-based where necessary to attain and maintain State water quality standards.

Under water quality-based permitting, pollution control is achieved through the integration of the chemical-specific, whole-effluent toxicity, and biological criteria approaches. The chemical-specific approach limits specific pollutants (including conventional and toxic pollutants) based on applicable water quality (numeric) criteria and standards. The whole-effluent toxicity approach limits the overall toxicity of effluents as measured by biological toxicity tests and is especially applicable when specific pollutants in complex wastes have not been or cannot be identified, nor their interactions assessed. In this case the determination of effluent limitations or controls is based on the toxicity of the whole effluent, in addition to that of a specific chemical, in order to address numeric and narrative State water quality standards. The narrative "no toxics in toxic amounts" standard is common to all State water quality standards. EPA is placing increased emphasis on the whole-effluent toxicity approach and has developed detailed technical guidance on its use (USEPA, 1991).

Biological criteria provide a measurement of the ecological integrity of waterbody uses. The biological criteria approach involves the use of numeric or narrative values to describe the

biological integrity of aquatic communities in a reference waterbody. Biosurveys are then used to collect information on the overall health of aquatic communities in a waterbody of interest. Results of the biosurveys are compared to data for the reference waterbody to determine whether the criteria are met. This approach assesses the biological community as a whole and measures trends and changes in condition over time. The concept of biocriteria is still developing, and thus most States are not using biocriteria as part of their water quality-based permits. However, biocriteria are being used by some States to help define designated uses of waterbodies and enforce water quality standards (primarily in freshwater conditions). Biological criteria are also being used to target places for controls derived using the chemical-specific and whole-effluent approaches. EPA is currently developing guidance for States to develop biocriteria in marine and estuarine waters.

State water quality standards apply to all waters inside the baseline and to the territorial seas. In addition, all NPDES discharges to the territorial seas and to the open ocean (Federal waters beyond the territorial seas where State standards do not apply) are required to comply with the provisions of section 403, as well as any other applicable CWA requirements, before a permit can be issued.

Legislative and Regulatory History of Section 403

Water pollution control legislation prior to the passage of the Federal Water Pollution Control Act (now the Clean Water Act, as amended) in 1972 had focused primarily on inland coastal waters. However, increasing exploitation of the oceans and accidents such as the Torrey Canyon and Santa Barbara oil spills heightened public awareness of the need to protect the oceans from the impacts of pollution. Section 403 of the CWA was passed to address this growing concern. Congress believed that the recreational and economic importance of marine resources, as well as the limited understanding of marine systems at the time, demanded more stringent protective measures than those provided by technology- or effluent-based standards (Public Law 92-500, 1972).

On October 15, 1973, EPA promulgated combined regulations implementing section 102(a) of the Marine Protection, Research, and Sanctuaries Act (regulating ocean dumping activities) and section 403 of the CWA. EPA later found, however, that these regulations proved unworkable in many respects as section 403 marine discharge criteria, due in part to statutory distinctions as well as differences in the manner of disposal and the types of pollutants discharged. EPA therefore determined that both the ocean dumping regulations and the marine discharge criteria should be revised and published as separate regulations. As a result, all references to section 403 were deleted from the revised ocean dumping regulations promulgated in 1977. EPA subsequently issued the section 403 Ocean Discharge Criteria, which became effective on November 3, 1980 (40 *CFR* Part 125, Subpart M [45 *FR* 65942, October 2, 1980]).

Until recently, the focus of the section 403 marine discharge program has been the regulation of offshore oil and gas activities. This was due in part to the large number of offshore oil and gas facilities as compared to the number of land-based marine discharges. In 1980, there were an estimated 3,000 offshore oil and gas facilities in operation as compared to approximately 232 land-based facilities discharging to ocean waters (45 *FR* 65944, October 3, 1980). In addition, land-based facilities discharging to the territorial seas were already regulated by the coastal States' water quality-based permitting programs. Because State water quality standards do not apply beyond the territorial seas, a similar program for marine discharges beyond the territorial seas does not exist. Section 403 has been particularly useful in such waters, providing a clear basis for addressing water quality-based concerns.

EPA recently began to emphasize the need for requiring discharges to the territorial seas to meet the objectives of section 403. This was because, although the State water quality standards program is designed to be applicable to the waters of the territorial seas as well as waters inside the baseline, many States do not have applicable water quality standards for marine/estuarine waters. A recent EPA assessment of pollutants of concern discharged to marine and estuarine waters illustrates this point (USEPA, 1990a). Although the assessment was not comprehensive in scope, its end result was the development of a list of pollutants believed to pose a significant threat to marine and estuarine environments (Table 2). The pollutants were those believed to be prevalent in marine/estuarine waters and/or toxic to marine/estuarine organisms. This list of pollutants of concern was further refined and shortened based on an assessment of the pervasiveness of the pollutants in these environments, as determined by how often they were limited in NPDES permits and through a comparison with EPA and other data sources. Only those pollutants originating primarily from point source discharges were included on this shorter list. As illustrated in the comparison of pollutants of concern to EPA criteria and State standards (Table 3), of the 16 pollutants of concern, 7 have no applicable State water quality standards for marine/estuarine waters. It should be noted that as a result of the recently promulgated National Toxics Rule, many more of the listed pollutants of concern will be addressed in State water quality standards (57 *FR* 60848, December 22, 1992). If environmental impacts resulting from the discharge of these pollutants is suspected, section 403 can be used to require additional environmental assessments of those industrial facilities which discharge these pollutants to State waters (territorial seas).

Where the Section 403 Program Has Been Most Useful in Protecting the Marine Environment

The section 403 program has been most successful and necessary in regulating offshore oil- and gas-related discharges and other discharges to ocean waters beyond the territorial seas where State water quality standards are not applicable. Other than technology-based standards, section 403 is the only regulatory mechanism for controlling effluent discharges

Table 2. Long List of Pollutants of Concern and Environmental Media in Which They Were Measured

Chemical Name	Environmental Media in which Measured ^a	Chemical Name	Environmental Media in which Measured ^a
PAHs			
PAHs (total)	Benthic	Endrin	Fish tissue
Acenaphthene	Benthic	Heptachlor	Fish tissue
Acenaphthylene	Benthic	Hexachlorocyclohexane	Fish tissue/benthic
Anthracene	Benthic	Isophorone	Benthic
Benzo(a)anthracene	Water column/benthic	Methoxychlor	Fish tissue
Benzo(a)pyrene	Water column/benthic	Mirex	Fish tissue
Benzo(b)fluoranthene	Benthic	Toxaphene	Fish tissue
Benzo(g,h,i)perylene	Benthic	Trans - Nonachlor	Fish tissue
Benzofluoranthenes	Water column/benthic	OTHER POLLUTANTS	
Chrysene	Benthic	2,4-Dimethylphenol	Benthic
Coronene	Fish tissue	2-Methylnaphthalene	Benthic
Dibenz[a,h]anthracene	Benthic	2-Methylphenol	Benthic
Fluoranthene	Fish tissue	4-Methylphenol	Benthic
Fluorene	Benthic	Benzoic acid	Benthic
Indeno[1,2,3-cd]pyrene	Benthic	Benzyl alcohol	Benthic
Naphthalene	Benthic	Chlorinated benzenes	Fish tissue
Perylene	Fish tissue	Cymene isomers	
Phenanthrene	Benthic	meta-	Benthic
Pyrene	Benthic	ortho-	Benthic
METALS		para-	Benthic
Aluminum	Fish tissue	Dichlorobenzenes	
Antimony	Benthic	1,2-Dichlorobenzene	Fish tissue
Arsenic	Water column/benthic	1,3-Dichlorobenzene	Benthic
Beryllium	Benthic	1,4-Dichlorobenzene	Benthic
Cadmium	Water column	Dioxin (2,3,7,8-TCDD)	Fish tissue/water column
Chromium	Water column	Diphenyl ethers	
Copper	Water column	Ethylbenzene	Benthic
Cyanide	Fish tissue/water column	Hexachlorobenzene	Fish tissue
Iron	Multiple areas	Hexachlorobutadiene	Fish tissue
Lead	Multiple areas	Hexachloroethane	Benthic
Manganese	Fish tissue	Nitrosodiphenyl amine	Benthic
Mercury	Multiple areas	PCBs (total)	Multiple areas
Nickel	Water column	Aroclor 1242	Fish tissue
Selenium	Benthic	Aroclor 1254	Fish tissue
Silver	Benthic	Pentachlorophenol	Benthic
Thallium	Benthic	Phenol	Benthic
Tin	Fish tissue	Phthalate esters	
Zinc	Water column	BIS (2-ethylhexyl)	Benthic
PESTICIDES		Butyl benzyl	Benthic
Aldrin	Benthic	di-n-butyl	Benthic
Chlordane	Fish tissue	Diethyl	Benthic
DDD	Fish tissue	Dimethyl	Benthic
DDE	Fish tissue	Trichloroethene	Benthic
DDT	Multiple areas	Trichlorophenol	Benthic
Dieldrin	Fish tissue	Xylene (total)	Benthic

^a Based on 10 monitoring projects conducted by EPA and NOAA: Puget Sound, Black Rock Harbor, Narragansett Bay, San Francisco Bay, Baltimore Harbor, Quincy Bay, Lake Ontario, Lake Michigan, NOAA/National Status and Trends: 1987 Progress Report, and NOAA/National Ocean Service Fish and Shellfish Historical Assessment.

**Table 3. Short List of Pollutants of Concern:
Water and Sediment Criteria**

Pollutants of Concern (Chemical Abstracts Service (CAS) Registry Number in Parenthesis)	EPA Marine Acute Criteria	EPA Marine Chronic Criteria	# Of States With Marine Standards	EPA Fresh Acute Criteria	EPA Fresh Chronic Criteria	Human Health Criteria	EPA Interim Sediment Criteria	# Of States With Sed. Criteria
Hexachlorobenzene (118-74-1)	x	x	o	o	o	x	o	1
Pentachlorophenol (87-86-5)	x	x	3	x	x	x	o	1
Fluorene (86-73-7)	o	o	o	o	o	x	x	1
Phenanthrene (85-01-8)	x	x	o	x	x	x	o	1
Anthracene (120-12-7)	o	o	o	o	o	x	o	1
Fluoranthene (206-44-0)	*	*	o	*	o	x	o	1
Pyrene (129-00-0)	o	o	o	o	o	x	o	1
Benzo(a)pyrene (50-32-8)	o	o	o	o	o	x	o	1
Cadmium (7440-43-9)	x	x	10	x	x	x	o	1
Chromium (7440-47-3)	x	x	7	x	x	x	o	0
Copper (7440-50-8)	x	o	7	x	x	x	o	1
Cyanide (87-86-5)	x	o	11	x	x	x	o	0
Lead (7439-97-6)	x	x	11	x	x	x	o	1
Mercury (7439-97-6)	x	x	10	x	x	x	o	1
Nickel (7440-02-0)	x	x	8	x	x	x	o	1
Zinc (7440-66-6)	x	x	11	x	x	o	o	1

x - Yes
 o - No
 * - Value is lowest observed effect level
 Note: - Where numeric criteria standards are not in place, pollutants may be controlled by narrative criteria.

that occur seaward of State waters (i.e., 3 miles from shore). The program has also been effective for regulating discharges to the territorial seas where State standards are applicable but in many cases have not yet been established (for example, for the control of the seven pollutants of concern on Table 3 for which no State marine standards exist).

Section 403 has been particularly effective in protecting sensitive aquatic habitats or sites in which technology-based or water quality-based controls may not be sufficient to ensure protection of the particular marine environment, necessitating more stringent controls to ensure that section 403 criteria are met. Such sensitive habitats and areas might include coral reefs, spawning sites, nursery or forage areas, migratory pathways or areas necessary for other functions or critical stages in the life cycle of the organism, areas of high productivity, or areas under stress due to biological or climatic conditions or discharges from other sources.

The individual NPDES permits issued to eight offshore oil companies to drill in the vicinity of the Flower Garden Banks (a hermatypic coral community in the north central Gulf of Mexico) serve as an example of where section 403 has been used to protect sensitive aquatic resources in a situation where technology- and water quality-based controls may not have been adequate to protect these resources. As a result of evidentiary hearings on the permits proposed by EPA for these discharges, an analysis of permit compliance with section 403 was conducted. An environmental hazard assessment was conducted as part of this analysis. The results of this assessment served as the basis for a negotiated settlement between the industry and environmental groups. The settlement included the establishment of an effects-based criterion (a concentration of drilling fluids that, on the basis of laboratory and field data, was determined to be adequately protective of coral) that was required to be met at the biological resource (the coral reef). This approach differs from the water quality-based approach in several ways, including the following:

- A specific biological resource in situ was the target for achieving a criterion concentration for the effluent.
- The criterion was based on the characteristics of the resource, not the effluent.
- The criterion was specified as having to be attained at a distance relative to the resource, not some regulatory distance from the discharge.

3. IMPLICATIONS OF EXTENDING SECTION 403 INSIDE THE BASELINE

Potential Applications

With recent improvements in water quality mixing zone models for estuarine and marine environments and the development and adoption of whole-effluent toxicity testing requirements, EPA questions the need for and utility of implementing section 403 for all estuarine discharges. With the development of these improved methods, together with existing water quality-based permitting tools, the water quality-based permitting approach accomplishes many of the objectives of section 403. Under most circumstances, when water quality evaluations are appropriately applied/conducted, the section 402 program provides a level of environmental protection to the estuarine environment similar to that which would be achieved with the implementation of section 403 requirements. The steps and information required in writing a water quality-based NPDES permit for an estuarine discharger to a major degree address the environmental concerns of the section 403 criteria. Tables 4 and 5 provide a point-by-point comparison illustrating this point.

Because of the similar degree of protection already afforded by other existing CWA requirements, EPA does not believe a wholesale extension of section 403 inside the baseline is necessary. Rather, EPA believes that if Congress were to decide to extend the section 403 requirements to estuarine waters, the requirements would best be applied on a case-by-case basis to complement existing approaches to water pollution control in estuarine environments in certain areas:

- Additional protection of particularly sensitive estuarine resources that are shown to be experiencing stress from point source discharges.
- Assessment of alternative discharge locations where relocation of the discharge may reduce potential impacts on sensitive resources.
- Assessment of the potential impact on ecological resources in State waters that do not have State water quality standards for the pollutant of concern.
- Requiring an evaluation and installation of pollution prevention controls (as opposed to end-of-pipe controls) as a permit condition if necessary to protect the environment.
- Requiring that the discharger (rather than the permitting authority) provide sufficient information to demonstrate that no unreasonable degradation or irreparable harm is occurring or will occur as a result of the discharge.

Table 4. Comparison of the Water Quality Standards and Permitting Process and Section 403 Ocean Discharge Guidelines (§ 125.122)

Ocean Discharge Guidelines (§ 125.122)	Comparable Water Quality-Based Tool(s)
1) Quantities, composition, and potential bioaccumulation or persistence of pollutants to be discharged	<ul style="list-style-type: none"> • Chemical-specific effluent analysis <ul style="list-style-type: none"> - effluent characterization - bioaccumulation evaluation • Assessment of the persistence of effluent toxicity
2) Potential transport of the pollutants by biological, physical, or chemical processes	<ul style="list-style-type: none"> • Chemical-specific effluent analysis <ul style="list-style-type: none"> - bioaccumulation evaluation • Modeling fate and transport <ul style="list-style-type: none"> - water column - sediment • Sediment criteria (in development)
3) Composition and vulnerability of potentially exposed biological communities	<ul style="list-style-type: none"> • State water quality standards <ul style="list-style-type: none"> - designated use determinations, including consideration of existing biological communities - chemical-specific water quality criteria - whole-effluent toxicity testing - biocriteria/bioassays—evaluation of the biological condition of a waterbody • Mixing zone considerations <ul style="list-style-type: none"> - should not impinge on unique or critical habitats - should not extend to restrict passage of swimming organisms - should not encroach on areas often used for fish harvesting
4) Importance of the receiving water area to the surrounding biological community	<ul style="list-style-type: none"> • State water quality standards <ul style="list-style-type: none"> - designated use determination, including consideration of existing biological communities and outstanding natural resource waters - biocriteria/biosurveys

Table 4. (continued)

Ocean Discharge Guidelines (§ 125.122)	Comparable Water Quality-Based Tool(s)
5) Existence of special aquatic sites	<ul style="list-style-type: none"> • State water quality standards <ul style="list-style-type: none"> - designated use determinations, including consideration of existing biological communities and outstanding natural resource waters - biocriteria/biosurveys • Mixing zone considerations <ul style="list-style-type: none"> - should not impinge on unique or critical habitats
6) Potential direct or indirect impacts on human health	<ul style="list-style-type: none"> • State water quality standards <ul style="list-style-type: none"> - water quality criteria for human health protection • Mixing zone considerations <ul style="list-style-type: none"> - should not encroach on drinking water intakes - should not be projected to result in significant health risks to consumers of fish and shellfish
7) Existing or potential recreational and commercial fishing	<ul style="list-style-type: none"> • State water quality standards <ul style="list-style-type: none"> - designated use considerations, including consideration of existing biological communities and fishing uses • Mixing zone considerations <ul style="list-style-type: none"> - should not encroach on areas often used for fish harvesting
8) Any applicable requirements of an approved CZMP	<ul style="list-style-type: none"> • State CZM certification process
9) Such other factors relating to the effects of the discharge as may be appropriate	<ul style="list-style-type: none"> • State water quality standards <ul style="list-style-type: none"> - sediment criteria • Exposure and wasteload allocations • Others
10) Marine water quality criteria	<ul style="list-style-type: none"> • Chemical-specific marine water quality criteria

Table 5. Comparison of the Water Quality Standards and Permitting Process and Information Required to Be Submitted by the 403 Applicant Pursuant to § 125.124

Information Required Under § 125.24	Comparable Water Quality-Based Tool(s)
a) Analysis of the chemical constituents of any discharge	<ul style="list-style-type: none"> • Chemical-specific effluent analysis
b) Appropriate bioassays necessary to determine the limiting permissible concentrations of the discharge	<ul style="list-style-type: none"> • Whole-effluent aquatic toxicity tests
c) Analysis of initial dilution	<ul style="list-style-type: none"> • Mixing zone considerations
d) Available process modifications that will reduce the quantities of pollutants that will be discharged	<ul style="list-style-type: none"> • Effluent guidelines • Toxicity reduction evaluations
e) Analysis of location where pollutants are sought to be discharged, including the biological community and the physical description of the discharge facility	<ul style="list-style-type: none"> • State water quality standards <ul style="list-style-type: none"> - designated use determinations, including consideration of existing biological communities, outstanding natural resource waters, and fishing uses • Mixing zone considerations <ul style="list-style-type: none"> - should not extend to restrict passage of swimming organisms - should not impinge on unique or critical habitats - should not encroach on areas often used for fish harvesting
f) Available alternatives to the discharge of the pollutants, including an evaluation of the possibility of land-based disposal or disposal in an approved ocean dumping site	<ul style="list-style-type: none"> • No water quality-based equivalent

Protection of Sensitive Habitats. Estuaries are economically and environmentally important biological areas that are known to be sensitive to human activities. They are also the ultimate sinks of many pollutants discharged from numerous sources within the estuary itself, as well as those from upstream sources. As discussed previously, discharges to estuarine waters are already subject to many CWA pollution control requirements, and EPA believes that, when appropriately and effectively applied, the water quality standards and permit provisions of CWA sections 303 and 402 can provide a level of protection to most estuarine environments similar to that provided by the provisions of section 403. However, under certain circumstances, section 403 can be used to require additional assessments of the potential impacts of effluent discharges on particularly sensitive and ecologically important estuarine environments in the vicinity of the discharge and in surrounding waters. Such assessments could include ambient monitoring and the equivalent of an Ocean Discharge Criteria Evaluation (ODCE).

The existing NPDES water quality-based approach is designed to protect aquatic life from the effects of pollutant discharges. For the protection of aquatic life, the water quality-based approach involves an integrated strategy comprising three approaches: the chemical-specific approach, the whole-effluent toxicity approach, and the biocriteria/bioassessment approach. In addition, under the water quality-based approach, sediment contamination monitoring is also recommended to determine whether contaminants are accumulating in sediments to the extent that unacceptable levels are being approached or exceeded. These same approaches are most often the basis for making section 403 determinations. Therefore, the benefits of extending section 403 inland would be limited to those cases where, for example, State standards are still in development or where unique species or sensitive resources may be threatened by a particular discharge.

Alternative Assessments. One section 403 provision not specifically addressed by the existing water quality standards and water quality-based permitting process is consideration of available alternatives to the discharge of pollutants. The section 403 regulations specify that, if insufficient information is available prior to permit issuance to determine that there will be no unreasonable degradation of the marine environment, a permit can be issued only if additional criteria are met. One of these criteria is that an alternative assessment be conducted to demonstrate that "there is no reasonable alternative to the on-site disposal of these materials." Under such an assessment, the applicant for the discharge permit must provide an evaluation of available alternatives to the current discharge. Such alternatives could include either disposal to facilities located on land or discharge to an alternative site. Thus, where the precise impacts of a discharge are uncertain, one benefit of section 403 is to require an assessment of alternatives to on-site direct discharges. By requiring an alternative assessment, section 403 can be used on a permit-by-permit basis to ensure that options other than on-site disposal to estuarine waters have been investigated and that the relative impacts (social, economic, and environmental) of each disposal option have been evaluated.

Pollution Prevention. Both section 403 and the water quality-based approach can promote pollution prevention provisions as part of a discharge permit. For example, toxicity reduction evaluations (TREs) are the principal mechanism for bringing a discharger into compliance with water quality-based whole-effluent toxicity requirements. In some cases, TREs allow the discharger the opportunity to investigate the causes of toxicity and to identify corrective action. The requirement to conduct a TRE may be written into the special conditions section of an NPDES permit that contains whole-effluent toxicity limits; however, the TRE is conducted only upon identifying noncompliance with those limits. In some cases, TREs can also be required through a separate notice, such as a section 308 letter, Administrative Order, or Consent Decree. Corrective actions to reduce toxicity may involve simple housekeeping activities or treatment or source reduction options. Under section 403, the permitting authority can request of an applicant information on available process modifications that will reduce the quantities of pollutants to be discharged prior to permit issuance. In addition, if during permit review the permitting authority determines that there is insufficient information to determine whether unreasonable degradation of the environment will occur as a result of a discharge, the authority can require process modifications as part of a permit. Because section 403 can be used to require an applicant to evaluate process modifications in cases where the discharge has not been shown to satisfy the "no unreasonable degradation" requirements of section 403, it can be used to place greater emphasis on pollution prevention.

Burden of Proof. Section 403 requires the discharger to provide sufficient information to demonstrate that the discharge will not cause unreasonable degradation of the environment. If the permitting authority determines that there is insufficient information to make such a determination, ambient monitoring can be required of the discharger as part of the section 403 permit. Although other CWA provisions can be used to require evaluations related to compliance with permit requirements, by allowing EPA to require such information when necessary to determine whether "unreasonable degradation" will result, section 403 provides an added ability to require environmental monitoring of the impacts of the discharge.

Potential Difficulties

The problems associated with implementing section 403 inside the baseline are primarily related to the (1) number of discharges potentially affected; (2) limited knowledge about all sources of pollutants (point and nonpoint discharges, drainages, and watersheds) and their fate in estuarine environments and effects on estuarine communities; and (3) resources necessary to implement the program for all affected dischargers. While the problems of implementing 403 inside the baseline are essentially similar to those currently posed by 403 implementation, the application of section 403 to estuarine waters will be less straightforward because of the inherent complexity of estuaries (physical, chemical, and biological) and the complex pollutant loadings involved (point and nonpoint sources; municipal, industrial, urban, and agricultural sources). The extent of these implementation issues will depend on the extent to which section 403 may be applied. Application may range from

full implementation for all estuarine discharges to partial implementation for specific facilities, industries, pollutants, waterbodies, and receiving environments. Alternatively, the decision may be made not to apply section 403 within the baseline.

Number of Discharges Potentially Affected. EPA recently conducted an assessment of effluent discharges to estuarine waters (direct discharges to estuarine waters and discharges to waters in estuarine drainage areas) of the United States (USEPA, 1990a). This assessment was designed to provide an estimate of the number and types of industrial and municipal discharges occurring in estuarine waters. The assessment was based on an evaluation of the National Oceanic and Atmospheric Administration's National Coastal Pollutant Discharge Inventory (NCPDI) and EPA's Permit Compliance System (PCS) permit inventory. The discussion that follows presents a summary of the results from this assessment. The purpose of the discussion is to provide an estimate of the number and types of discharges that might be affected if compliance with section 403 were to include discharges to estuarine waters.

EPA estimates that there are almost 20,000 industrial and municipal discharges occurring in estuarine waters of the United States (Table 6). These include major and minor discharges. Of these, nearly 5,000 are discharges from publicly owned treatment works (POTWs). Approximately one-fourth of these POTWs receive indirect discharges from industrial facilities requiring pretreatment. It is also estimated that one-third of all estuarine discharges occur in the following six major estuarine drainage basins:

- Chesapeake Bay (1,805);
- Galveston Bay (1,414);
- Delaware River and Bay (1,058);
- Atchafalaya/Vermillion Bays (989);
- Connecticut River and Long Island Sound (894); and
- Lake Pontchartrain (704).

EPA estimates that the total number of major discharges to estuarine waters is more than 2,600. Of these major discharges, almost 2,000 are discharges from POTWs and industrial facilities in 12 specific industrial categories identified as posing a significant threat to estuarine environments (Table 7). Table 8 presents the estimated number of major discharges from facilities in these industrial categories of concern and POTWs by Region and State. More than half of these discharges (1,126) are from POTWs, less than one-third of which receive indirect discharges from industrial facilities requiring pretreatment.

Scientific Limitations. The limits of scientific information to address the Ocean Discharge Criteria restrict EPA's ability to fully implement section 403 inside (as well as outside) the baseline. Many of the technical/scientific problems posed in implementing section 403 inside the baseline are not unique to this program. However, the section 403 program complicates these limitations further, as discussed below.

Table 6. Estimated Number of Point Source Discharges to Estuarine Waters

<u>Region</u>	<u>Major</u>	<u>Minor</u>	<u>Total</u>
1	486	1,833	2,319
2 ^a	406	2,030	2,436
3	271	2,459	2,730
4	532	2,337	2,869
6 ^b	545	5,945	6,490
9	166	1,102	1,268
<u>10</u>	203	<u>1,599</u>	<u>1,802</u>
Total	2,609	17,305	19,914

^a NCPDI does not report discharges for the U.S. Virgin Islands or Puerto Rico.

^b NCPDI does not report discharges for Guam, American Samoa, the Commonwealth of the Northern Marianas, or Palau.

Table 7. Industrial Categories of Concern^a

Inorganic chemical products	Pharmaceuticals
Machinery	Phosphatic fertilizers
Metal finishing	Primary nonferrous metals
Organic chemical products	Pulp and paper
Pesticide products	Shipbuilding/machinery
Petroleum refining	Steam electric/recycled cooling

^a This list of industrial categories of concern was developed based on an assessment of the National Oceanic and Atmospheric Administration's National Coastal Pollutant Discharge Inventory (NCPDI). The industrial categories of concern are those which were identified in the NCPDI as having relatively high concentrations of priority pollutants and which have the largest number of facilities discharging greater than 1.0 MGD of effluent to near coastal waters.

**Table 8. Estimated Number of Major Discharges to Estuarine Waters
from Facilities in the Industrial Categories of Concern
and POTWs (by Region and State)**

Category	Reg. 1					Reg. 2*		Reg. 3					Reg. 4						Reg. 6		Reg. 9 ^b		Reg. 10			Total
	CT	MA	ME	NH	RI	NY	NJ	DC	DE	MD	PA	VA	AL	FL	GA	MS	NC	SC	LA	TX	CA	HI	AK	OR	WA	
Inorganic Chemical Products	1	1	1	-	-	-	19	-	5	9	-	1	4	4	2	1	2	-	17	11	6	-	-	1	2	87
Machinery	4	1	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Metal Finishing	31	16	1	1	1	1	8	-	-	3	3	2	-	-	-	1	2	4	1	2	-	-	-	-	-	77
Organic Chemical Products	1	6	-	-	1	3	14	-	4	1	1	4	1	4	-	2	3	7	14	24	1	-	-	-	1	92
Pesticide Products	1	1	-	-	1	2	19	-	1	3	1	2	5	4	-	1	2	1	31	44	1	-	-	1	-	121
Petroleum Refining	-	-	-	-	-	-	7	-	1	2	4	1	1	2	-	2	-	-	15	26	14	-	2	-	6	83
Pharmaceuticals	1	-	-	-	-	-	14	-	-	-	3	-	-	-	-	1	2	-	2	1	-	-	-	-	-	24
Phosphatic Fertilizers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3	1	-	-	-	-	-	5
Primary Nonferrous Metals	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	4	3	-	-	-	1	3	13
Pulp and Paper	3	11	14	5	1	1	3	-	-	-	3	3	7	7	7	2	5	4	6	8	3	-	2	9	15	119
Shipbuilding/Machinery	1	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	1	-	2	-	-	-	2	9
Steam Electric/Recycled Cooling	9	13	2	5	2	19	17	3	2	10	6	7	3	37	3	2	8	7	15	16	28	6	-	1	1	222
POTWs w/ Pretreatment	-	27	13	9	13	14	20	1	5	9	25	9	-	26	5	-	41	14	8	16	48	2	2	14	6	327
POTWs w/o Pretreatment	64	46	49	21	7	46	103	-	9	15	25	15	27	80	17	12	-	23	47	120	30	1	13	6	23	799
STATE TOTALS	116	122	80	41	27	88	225	4	27	54	71	46	48	165	34	24	66	60	164	272	133	9	19	33	59	-
REGIONAL TOTALS	386					313		202					397						436		142		111			1987

* NCPDI does not report discharges for the U.S. Virgin Islands or Puerto Rico.

^b NCPDI does not report discharges for Guam, American Samoa, the Commonwealth of the Northern Marianas, or Palau.

Section 403 stresses the assessment of the impact of a marine (estuarine) discharge both on the biological community in the area of the discharge and on surrounding biological communities. There are currently significant scientific limitations to addressing the complex issues of biological impacts and toxicity assessments in the marine environment. This problem is further complicated in tidal areas inside the baseline where environmental conditions can range from marine to estuarine to tidal freshwater. In each of these environments the physical/chemical/biological characteristics are different, and thus the assessment of biological impacts required under section 403 may require different sampling and analytical procedures, even within the same waterbody. Protocols will need to be developed to measure complex effluent toxicity, ambient toxicity, and biological community response for marine/estuarine and tidal freshwater environments and to predict the consequence of specific pollutant mixtures on the more biologically complex marine/estuarine population and community levels. Procedural and technical guidance will need to be developed to assist the EPA Regional offices and States in developing effects-based monitoring programs and discharge criteria evaluations that can reasonably assess environmental conditions and predict environmental impacts in such complex and diverse systems.

There are other complicating factors in assessing the direct impacts of discharges to estuarine waters. Coastal areas are generally the most populous areas in the country and as a result are subject to stress from numerous pollutant sources. Several point source discharges occurring in the same area make it difficult to determine a direct cause-and-effect relationship for a specific point source. Significant nonpoint source and atmospheric contributions of pollutants to a waterbody also make it difficult to establish a cause-and-effect relationship. In addition, estuaries are often the repository for contaminant-laden suspended solids from upstream sources, which tend to accumulate (along with historic, in-place contaminants) in the benthic sediment, further complicating an evaluation of any single discharge.

Resource Requirements. The resource-intensive nature of the section 403 program is one of the major constraints to implementing the program inside the baseline. EPA already identified the costs associated with implementing section 403 in marine waters as a concern in the Phase I Report to Congress. Because of the number of discharges that could potentially be affected, the costs associated with implementing section 403 inside the baseline would be substantially higher than those required to implement section 403 in marine waters alone. Figure 1 illustrates the current annual costs for implementing the 403 program for major direct marine discharges and the potential additional annual costs that could be incurred by EPA and NPDES-authorized States should compliance with section 403 be required of all major estuarine dischargers in the industrial categories of concern and POTWs.

The costs presented in Figure 1 have been broken down into those costs associated with issuing a typical water quality-based permit and those additional costs that would be associated with the added requirements of section 403. It should be noted that the water quality-based costs illustrated in Figure 1 represent only the costs required to write a water quality-based permit. All other costs, including those required for performing section 403-type reviews (i.e., the equivalent of an ODCE),

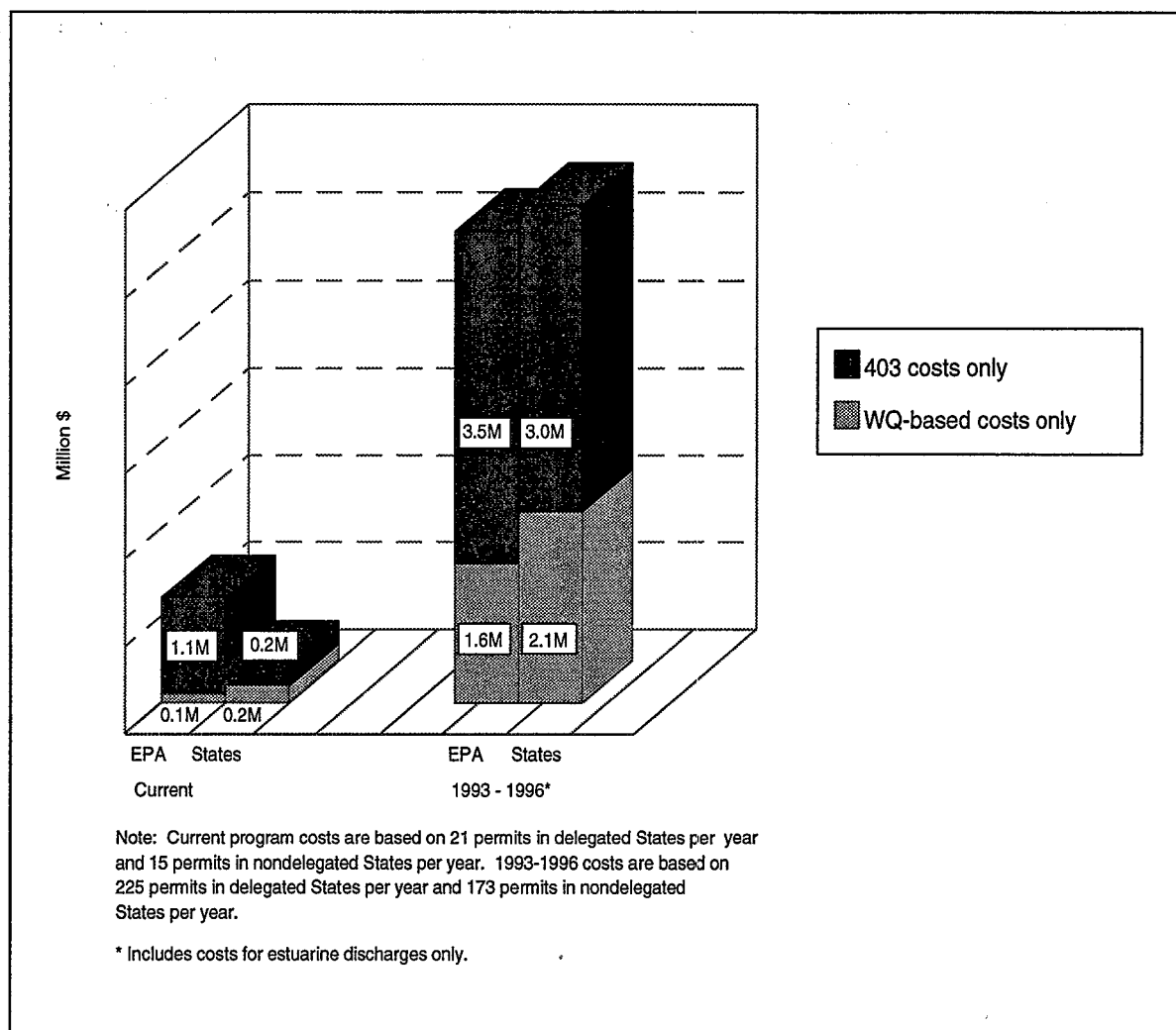


Figure 1. Estimated annual costs for EPA and NPDES-authorized States to implement requirements of section 403 inside the baseline.

for litigation, for analyzing monitoring data at the Regional or State level, and for EPA to monitor and provide guidance for State activities where States are the approved NPDES permitting authority, have been assigned as costs associated with section 403. The section 403-related costs presented in Figure 1 also include considerable program development and implementation costs that would be required should the section 403 program be implemented for discharges in estuarine waters. It should also be noted that in estimating the section 403 costs associated with implementing the program inside the baseline, it was assumed that all major dischargers would be required to conduct some form of ambient monitoring. In all likelihood, ambient monitoring would be required of only a portion of all major dischargers. The actual number of major dischargers that would be required to conduct ambient monitoring would be dependent on site-specific considerations such as effluent

characteristics, the water quality of the receiving stream, the presence of sensitive aquatic habitats, and other factors. For these reasons, the section 403-related costs illustrated in Figure 1 represent a conservative estimate.

Section 403 annual costs of implementation are estimated to be considerably greater than costs associated with implementation of the water quality-based permitting program alone, due primarily to the costs to the permitting authority associated with conducting Ocean Discharge Criteria Evaluations and reviewing ambient monitoring data. Both of these activities are labor-intensive and are normally not required under a typical NPDES permit. They are also two of the requirements of section 403 that generate the considerable amount of environmental data that allow permit writers to make more informed decisions concerning the impacts of marine/estuarine discharges. It should be emphasized that the costs associated with reviewing section 403 monitoring data for estuarine discharges would be significant, not only because of the potentially large number of discharges that would be affected, but also because of the need to be able to distinguish between the overlapping effects of multiple discharges to estuarine waters. Based on the review of such monitoring data, the permitting authority would have to be able to establish a cause-and-effect relationship for observed impacts in order to properly establish permit limitations for the responsible discharger(s). Such an assessment would require considerable time and resources.

Other Considerations. In addition to EPA and the NPDES-authorized States, considerable costs could be incurred by industries and municipalities should the provisions of section 403 be required of estuarine discharges. These costs would be associated with the resources that would be needed by some individual dischargers to design and implement ambient monitoring programs that normally are not included as conditions of NPDES permits. The costs incurred by estuarine dischargers as a result of the implementation of section 403 inside the baseline would depend on the number of dischargers required to conduct ambient monitoring and the site-specific monitoring requirements made in individual permits.

Also, although an existing data management system, such as the Ocean Discharge Evaluation System (ODES), could be used to store the enormous amount of environmental data that could potentially be generated should section 403 be implemented inside the baseline, considerable time and effort would still be required to maintain and evaluate such a large data base. In addition, committing the considerable resources that would be required to implement section 403 inside the baseline could potentially result in fewer available resources for other EPA and State programs. The length of time that would be required to evaluate the considerable amount of environmental data required under section 403 may also result in significant increases in backlogs and delays in permit reissuance. However, potentially significant delays also result from the need to review other data and issues for permit issuance, such as effluent, whole effluent toxicity, ambient water quality monitoring data, endangered species impacts, and conflicts with State water quality standards. These are not always issues unique to a section 403 review and are needed to make a comprehensive evaluation of the permit application. Such delays could have significant adverse

environmental consequences resulting from inadequately regulated estuarine discharges that are awaiting permit renewal decisions.

Congress did not specifically mention stormwater discharges in its request for information on estuarine point source discharges; however, in addition to industrial and municipal point source discharges, stormwater discharges are now regulated under the NPDES permitting program. It is therefore not clear whether Congress is considering the requirement that stormwater discharges to estuarine waters also comply with the provisions of section 403. Many thousands of stormwater sewers discharge to coastal areas. These point sources contribute significant pollutant loads to estuarine systems and can be a major contributor to environmental degradation. If full implementation of section 403 in estuarine waters is adopted by Congress, and if stormwater discharges are included under this section 403 program, the difficulties of managing the program and associated costs will increase significantly. Stormwater discharges were not considered in developing the cost estimates presented above. How to deal with stormwater discharges may be a significant problem if and when the section 403 program is implemented in estuaries.

Recommended Applications

Based on an evaluation of the potential benefits and problems associated with implementing the requirements of section 403 inside the baseline, it is apparent that it is neither necessary nor reasonable to require all estuarine discharges to fulfill the requirements of section 403. It is also apparent, however, that under certain circumstances the application of section 403 could generate additional valuable information about discharge impacts on receiving environments that would typically not be generated using other NPDES permitting approaches (e.g., technology-based, water quality-based). Section 403 could be used as an effective supplement to the water quality-based program for estuarine discharges in the following situations:

- When water quality standards that are applied to large segments of waterbodies may not be adequately protective of particularly sensitive habitats (e.g., coral reefs, shellfish beds) that may be present.
- When it is believed that an alternative discharge assessment could identify a less environmentally damaging discharge alternative.
- When State water quality standards do not exist for pollutants of concern.
- In other special circumstances where the permit writer does not feel sufficient information exists to make the appropriate permitting decision as stated in EPA's current regulations (40 *CFR* Part 125, Subpart M).

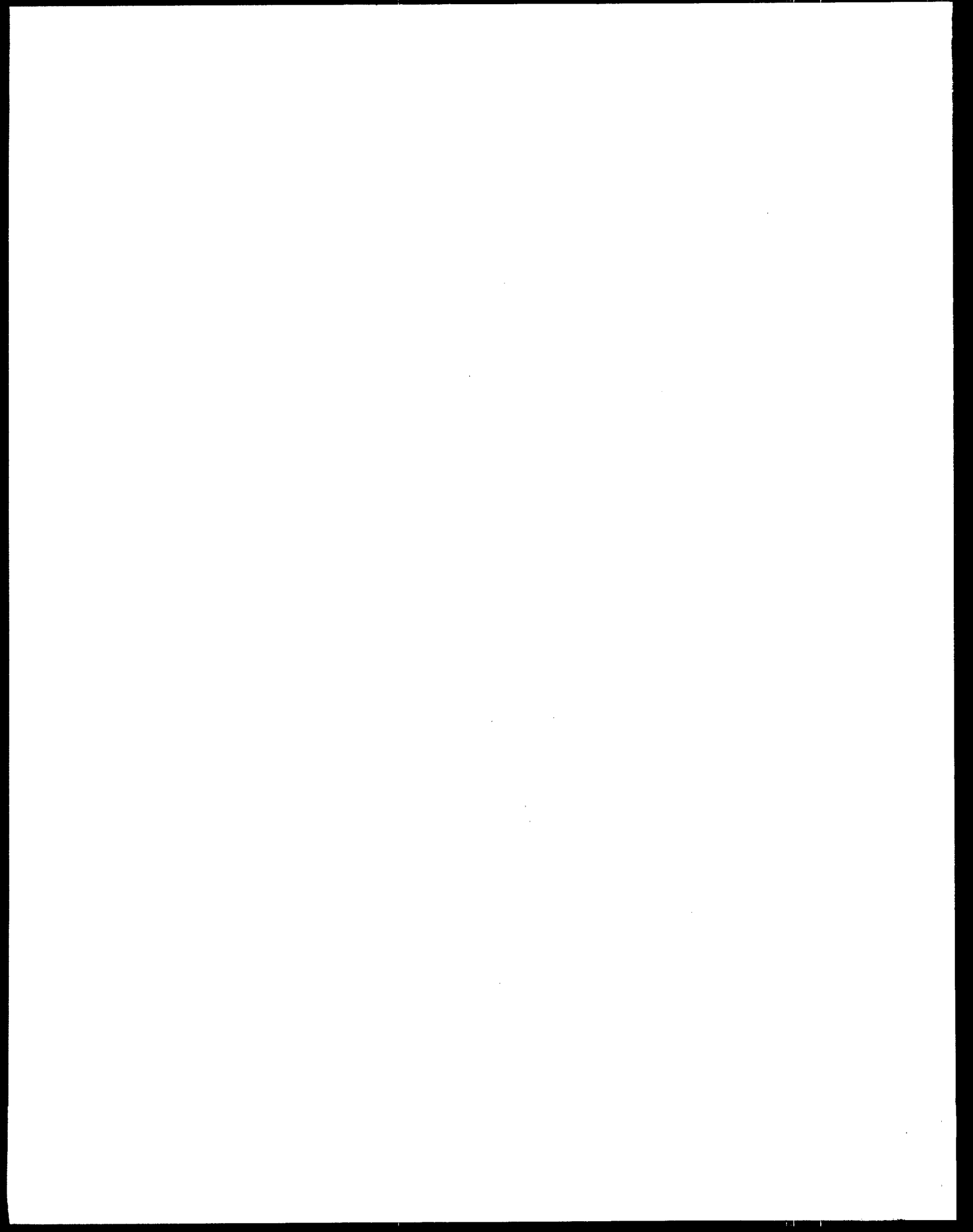
Implications

In such situations, the information generated under section 403 could improve the permitting authority's ability to make informed decisions during the permit review process concerning the potential environmental impacts of an estuarine discharge.

4. FINDINGS

Based on EPA's evaluation of estuarine discharges and pollutants of concern for estuarine waters and its assessment of the implications of requiring implementation of section 403 for such discharges, the Agency has developed the following findings:

- *Implementing section 403 for all estuarine discharges on a broad-scale basis is not necessary or advisable.* In the majority of cases, the water quality-based approach to permitting is sufficient to protect estuarine environments from unreasonable degradation due to effluent discharges. The limits of scientific information to address the Ocean Discharge Criteria restrict EPA's ability to fully implement section 403 inside the baseline. The costs to industry and municipalities associated with requiring all estuarine dischargers to conduct section 403-type assessments and the costs to EPA and NPDES-authorized States to review the information generated by these assessments could be disproportionately large compared to the environmental benefits that would be derived.
- *If Congress mandates the implementation of section 403 for estuarine discharges, EPA should be given authority to implement the program on a discretionary basis.* In certain circumstances, the requirements of section 403 could be used to focus environmental impact assessments on estuarine and other sensitive habitats that may not be fully protected by the water quality standards regulations of section 402 by making it easier to require certain types of information (e.g., monitoring data) from dischargers and by requiring an alternative discharge evaluation as stated in EPA's current regulation (40 CFR, Part 125, subpart M). Such circumstances would include (1) when less environmentally damaging alternatives to direct effluent discharge may be available; (2) when impacts may occur due to pollutants for which no water quality standards exist; and (3) any other circumstance where the permit writer does not believe sufficient information is available to make an informed decision concerning a discharge's potential impact on ecologically sensitive habitats or resources (e.g., coral reefs, shellfish beds).
- *As an alternative approach to extending section 403 authority, section 402 could be amended to specifically require assessments similar to those required under section 403 for select estuarine discharges of concern.* Either approach would achieve the same end result, the requirement for additional environmental assessments for those discharges of greatest concern in estuarine waters.



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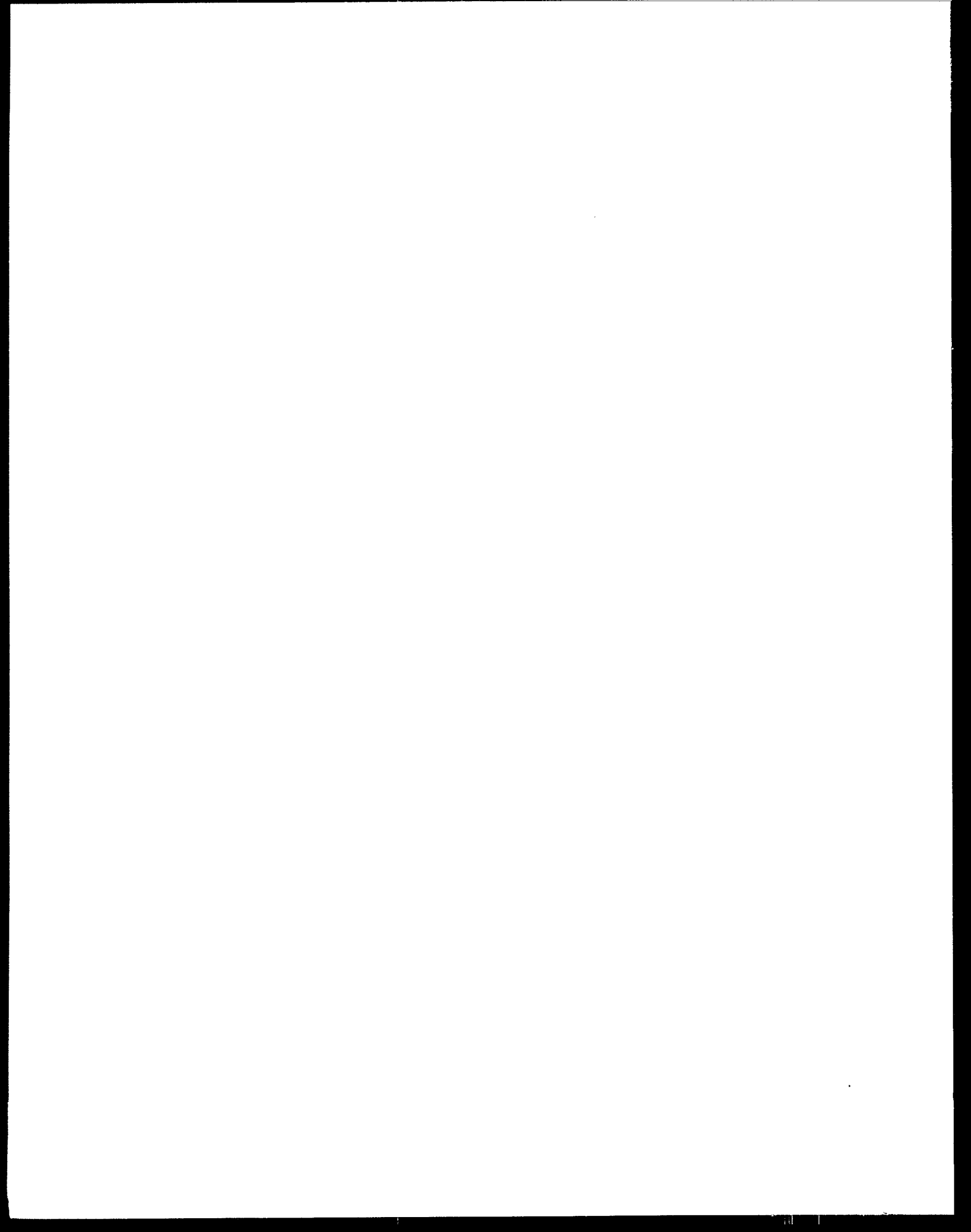
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GLOSSARY

Acute - involving a stimulus severe enough to rapidly induce a response; in marine and aquatic toxicity tests, a response observed in 96 hours or less typically is considered acute. An acute effect is not always a measure of lethality; it can measure a variety of effects. Note that acute means "short," not fatal.

Alternative assessment - an assessment of the relative impacts (economic, social, and environmental) of on-site effluent discharge versus discharge to an alternative site, land disposal, or another waste disposal alternative.

Baseline - the landward boundary of the territorial seas.

Bioaccumulation - uptake and retention of substances by an organism from its surrounding medium and from food.

Bioassay - a test used to evaluate the relative potency of a substance by comparing its effect on a living organism with the effect of a standard preparation on the same type of organism.

Biochemical oxygen demand (BOD) - a laboratory measurement of the "strength" or potency of an organic or inorganic waste. BOD values reflect the effect the waste may have on fish or other aquatic organisms that require oxygen to live.

Bioconcentration - uptake of substances from the surrounding medium through gill membranes or other external body surfaces.

Chronic - involving a stimulus that lingers or continues for a relatively long period of time, often one-tenth of the life span or more. Chronic should be considered a relative term depending on the life span of an organism. A chronic effect can be lethality, growth, reduced reproduction, etc. Chronic means "long-term."

Contiguous zone - defined in section 502(9) of the Clean Water Act to be the entire zone established or to be established by the United States under Article 24 of the Convention of the Territorial Sea and the Contiguous Zone.

Effluent biomonitoring - the measurement of the biological effects of effluents (such as toxicity, biostimulation, and bioaccumulation).

Effluent discharge (or discharge) - wastewater as it leaves some type of treatment system or facility, such as septic tank effluent or municipal or industrial wastewater treatment plant effluent.

Glossary

Effluent limitation - any restriction on quantities, rates, or concentrations of chemical, physical, biological, and other constituents that are discharged from point sources into waters of the United States, including navigable waters of the contiguous zone or the ocean.

Estuarine waters - deepwater tidal habitats and tidal wetlands that are usually enclosed by land but have access to the ocean and are at least occasionally diluted by freshwater runoff from the land (bays, mouths of rivers, salt marshes, lagoons).

Estuary - area where fresh water meets salt water (bay, mouth of a river, salt marsh, lagoon).

In situ - in the natural or original position.

Irreparable harm - significant undesirable effects occurring after the date of permit issuance that will not be reversed after cessation or modification of the discharge. (40 *CFR* 125.121(a))

Marine environment - the territorial seas, the contiguous zone, and the oceans.

Mixing zone - an allocated impact zone where acute and chronic water quality criteria can be exceeded as long as a number of provisions are maintained. A mixing zone can be thought of as a limited area or volume where the initial dilution of a discharge occurs.

National Pollutant Discharge Elimination System (NPDES) - the national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 301, 303, 307, 318, 402, 403, and 405 of the Clean Water Act.

Nonpoint source pollution - any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act.

Ocean Discharge Criteria Evaluation - procedure required as part of section 403 permitting decision process; includes consideration of 10 established ocean discharge criteria during permit review; provides a tool for determining unreasonable degradation and irreparable harm.

Ocean Discharge Guidelines - ten narrative guidelines listed at 40 *CFR* Part 125.122 of the Ocean Discharge Criteria Regulations for determination of unreasonable degradation of the marine environment.

Ocean Discharge Requirements - seven narrative requirements listed at section 403(c)(1)(A)-(G) of the Clean Water Act for determination of the degradation of the marine environment.

pH - a measure to indicate an acid or alkaline condition.

Point source pollution - generally defined as pollution of ground water or surface water supplies from a discrete conveyance such as a pipe or facility. Discharges of treated wastewater from municipal and industrial treatment plants or oil and gas platforms are examples of point sources of pollution.

Pollution prevention - a form of pollution control designed to reduce the quantities of pollutants requiring disposal through process modification and recycling as opposed to end-of-pipe controls.

Pretreatment - the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a POTW. The reduction or alteration may be obtained by physical, chemical, or biological processes; process changes; or other means, except as prohibited by 40 *CFR* Part 403.

Publicly-owned treatment works (POTW) - a treatment works, as defined in section 212(2) of the Clean Water Act, that is owned by a State, municipality, or intermunicipal or interstate agency.

Secondary treatment - the level of effluent quality defined in 40 *CFR* Part 133. Such biological (e.g., activated sludge) and/or physical-chemical treatment is designed to reduce the concentrations of dissolved and colloidal organic matter in wastewater that were not removed to any significant degree during primary treatment.

State waters - waters included within the boundary of a State and the territorial sea.

Stormwater discharge - precipitation that does not infiltrate the ground or evaporate due to impervious land surfaces but instead flows onto adjacent land or water areas and is routed into drain/sewer systems.

Technology-based treatment requirements - NPDES permit requirements based on the application of pollution treatment or control technologies including (under 40 *CFR* Part 125) BPT (best practicable technology), BCT (best conventional technology and secondary treatment for POTWs), BAT (best available technology economically achievable), and BADCT (best available demonstrated control technology) applicable to NSPS (new source performance standards).

Territorial seas - defined in section 502(a) of the Clean Water Act to be the belt of the seas measured from the line of ordinary low water along that point of the coast which is in direct contact with the open sea line marking the seaward limit of inland waters, or extending seaward a distance of 3 miles.

Total suspended solids - a measure of the small particles of solid pollutants that float on the surface of, or are suspended in, wastewater or waterbodies, determined by using tests for "total suspended nonfilterable solids."

Toxicity reduction evaluation (TRE) - a study conducted to determine the source(s) of toxicity in a discharge effluent so that these sources can be controlled sufficiently to allow a discharger to comply with their permit limits.

Toxicity test - the means to determine the toxicity of a chemical or an effluent using living organisms. A toxicity test measures the degree of response of an exposed test organism to a specific chemical or effluent.

Unreasonable degradation - significant adverse changes in ecosystem diversity, productivity, and stability of the biological community within the area of discharge and surrounding biological communities; threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms; loss of aesthetic, recreational, scientific, or economic value that is unreasonable in relation to the benefit derived from the discharge. (40 *CFR* 125.121(e))

Water quality-based toxics control - an integrated strategy used in NPDES permitting to assess and control the discharge of toxic pollutants to surface waters: the whole-effluent approach involving the use of toxicity tests to measure discharge toxicity and the chemical-specific approach involving the use of water quality criteria or State standards to limit specific toxic pollutants directly.

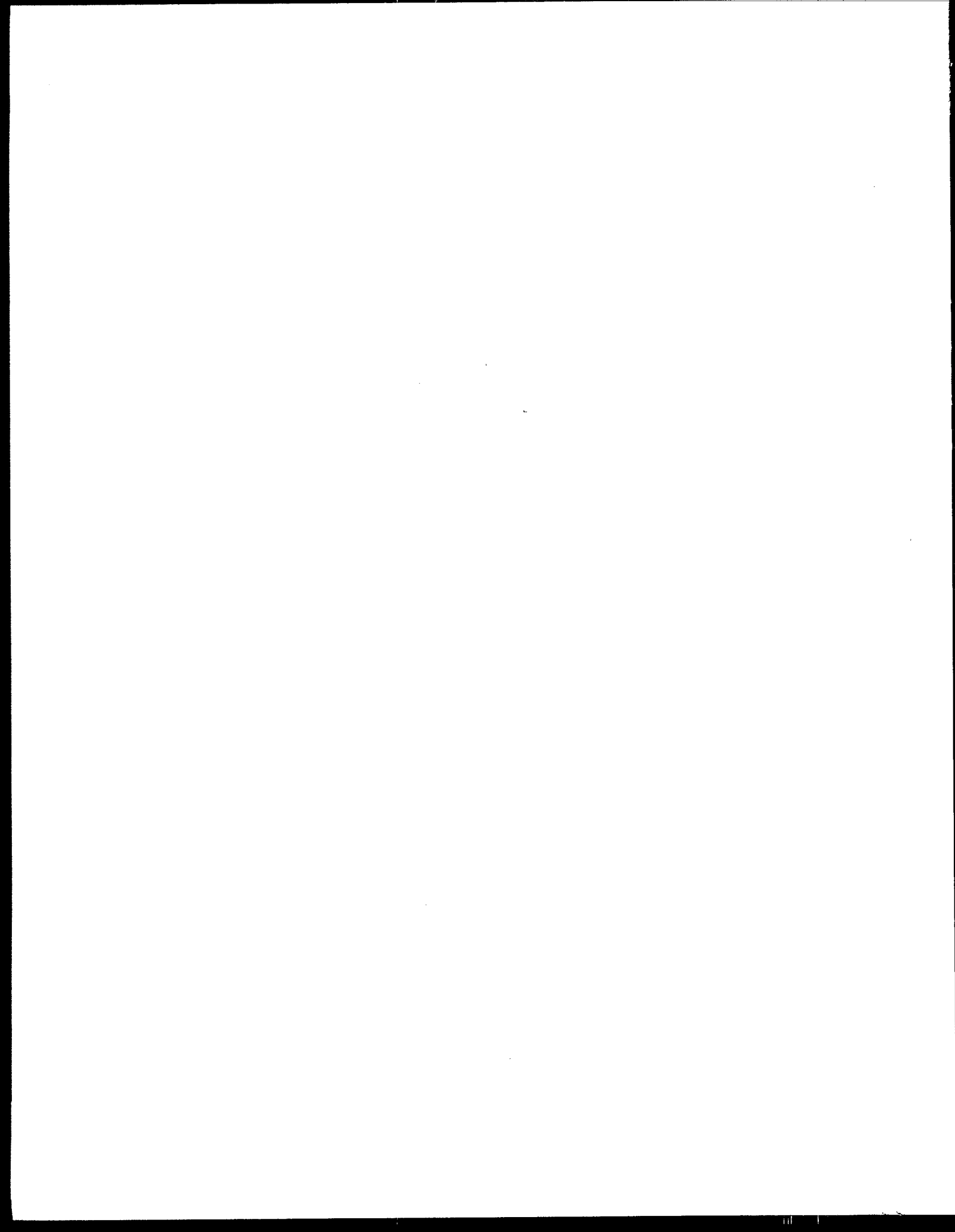
Water quality criteria - scientifically derived ambient limits developed and updated by EPA, under section 304(a)(1) of the Clean Water Act, for specific pollutants of concern. Criteria are recommended concentrations, levels, or narrative statements that should not be exceeded in a waterbody in order to protect aquatic life or human health.

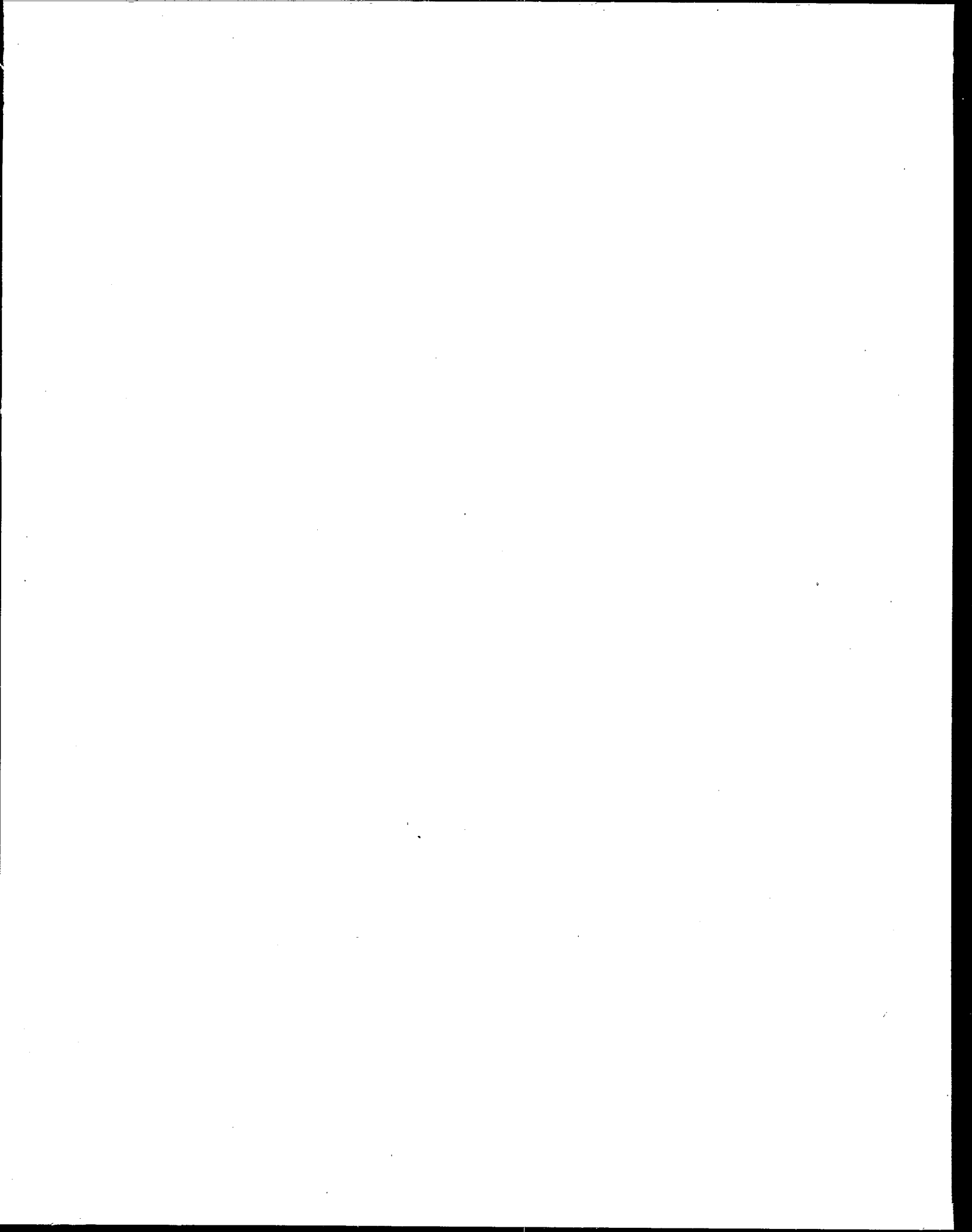
Water quality standards - laws or regulations, promulgated under section 303 of the Clean Water Act, that consist of the designated use or uses of a waterbody or a segment of a waterbody and the water quality criteria that are necessary to protect the use or uses of that particular waterbody. Water quality standards also contain an antidegradation statement. Every State is required to develop water quality standards applicable to the various waterbodies within the State and revise them every 3 years.

Whole-effluent toxicity - the aggregate toxic effect of an effluent measured directly by a toxicity test.

ACRONYMS

BOD	Biochemical oxygen demand
EPA	United States Environmental Protection Agency (also referred to as the Agency)
CWA	Clean Water Act
CZMP	Coastal Zone Management Plan
FWPCA	Federal Water Pollution Control Act (now amended and commonly known as the CWA)
NCPDI	National Coastal Pollutant Discharge Inventory
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
ODCE	Ocean Discharge Criteria Evaluation
ODES	Ocean Discharge Evaluation System
PCS	Permit Compliance System
POTW	Publicly Owned Treatment Works
TRE	Toxicity Reduction Evaluation







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